DR-37. STRUCTURAL, SPECTRAL, MAGNETIC AND THERMAL PROPERTIES OF Mn^{2+} DOPED ZnS NANOCRYSTALS FOR DEVICE APPLICATIONS

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In recent years, there have been enormous interests in making of semiconductor nanocrystals with particle sizes of 2 to 10 nm, which exhibit unexpected optical and electronic properties. Among the family of II–VI semiconductors Zinc sulfide (ZnS) with a wide band gap of 3,68 eV at room temperature and exhibits various tremendous potential applications particularly for the fabrication of nano-devices. The DMSs are obtained by adding a fraction of 3d transition metal ions into the host matrix. These transition metal ions based DMSs are most potential candidates for spintronic and display devices. However Manganese doped systems can show interesting properties.

In present investigation Mn^{2+} doped ZnS nanocrystals was prepared by chemical precipitation method at room temperature. The prepared sample was further investigated by various characterization techniques. XRD pattern of shows the prepared sample exhibited cubic phase of ZnS and the average crystallite size is found to be 3,2 nm. TEM image reveals the nanorods with spherical granule structure. The optical and EPR studies reveal that the incorporated Mn^{2+} ions entered into the host lattice distorted octahedral site symmetry. The PL spectrum exhibited blue and strong orange emissions. M-H curves exhibited a strong ferromagnetism at room temperature. TG-DTA studies show thermal stability of the sample. The prepared sample is displaying the properties useful for the applications such as light emitting diodes and spintronic devices.